LONWORKS® Communications Options Module

M/N RECOMM-LON
FRN 1.xx

User Manual

Rockwell Automation

Important User Information

Solid state equipment has operational characteristics differing from those of electromechanical equipment. *Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls* (Publication SGI-1.1 available from your local Rockwell Automation sales office or online at **http://www.vtacdrives.com**) describes some important differences between solid state equipment and hard-wired electromechanical devices. Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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Throughout this manual, when necessary we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

Important: Identifies information that is critical for successful application and understanding of the product.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequences.

Shock Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that dangerous voltage may be present.

Burn Hazard labels may be located on or inside the equipment (e.g., drive or motor) to alert people that surfaces may be at dangerous temperatures.

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Summary of Changes

This is a new release of Publication 9VTCOM-UM003A-EN-P, the RECOMM-LON LonWorks Communications Options Module User Manual. It replaces Publication VT-1002 – January 2003 which is no longer available.

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Related Documentation

For:	Refer to:	Publication
VTAC 9™ Drive	*VTAC 9 AC Drive User Manual*	9VT-UM001…
VS Utilities™	*VS Utilities Getting Results Manual* (and online help installed with the software)	D2-3488

Documentation can be obtained online at www.vtacdrives.com.

Rockwell Automation Support

If you have any questions or problems with the products described in this instruction manual, contact your local Rockwell Automation, Inc. authorized HVAC representative.

For technical assistance, please review the information in Chapter 5, Troubleshooting, first. Then check the VTAC drives web site (www.vtacdrives.com) for additional information. When you contact a Technical Support representative, you will be asked for the drive model number and this instruction manual number.

Conventions Used in This Manual

The following conventions are used throughout this manual:

- Parameter names are shown in the format **Parameter xx - [*]**. The xx represents the parameter number. The * represents the parameter name — for example, **Parameter 01 - [DPI Port]**.
- Menu commands are shown in bold type face and follow the format **Menu > Command**. For example, if you read "Select **File > Open**," you should click the **File** menu and then click the **Open** command.
- The firmware release is displayed as FRN X.xxx. The "FRN" signifies Firmware Release Number. The "X" is the major release number. The "xxx" is the minor update number.
- This manual provides information about the LonWorks® Communications Options module and using it with VTAC 9 AC drives. The module can be used with other products that support a DPI™ module. Refer to the documentation for your product for specific information about how it works with the module.

Getting Started

The RECOMM-LON module is a communication option intended for installation into a VTAC 9 drive.

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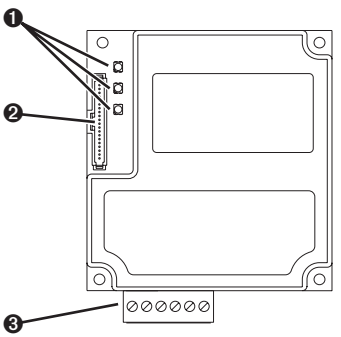
Components

Figure 1.1 Components of the Module



Item	Part	Description
1	Status Indicators	Three LEDs that indicate the status of the network connection, DPI, and the module. Refer to Chapter 5, Troubleshooting for details.
2	DPI Connector	A 20-pin, single-row shrouded male header. An Internal Interface cable is connected to this connector and a connector on the drive.
3	Terminal Block	A 6-pin terminal block with mating 6-pin linear plug connects the module to the LonWorks network.

Features

The RECOMM-LON LonWorks module features include:

- Typical mounting in a VTAC 9 drive.
- Captive screws to secure and ground the module to the drive.
- Compatibility with various configuration tools to configure the module and connected drive. The tools include the LCD OIM (Operator Interface Module) on the drive and VS Utilities (version 3.01 or higher) drive-configuration software.
- Status indicators that report the status of the drive communications, the module, and network. They are visible when the drive cover is open or closed.
- Support for LonWorks network functionality based on the LonMark Functional Profile: “Variable Speed Motor Drive: 6010.”
- Parameter-configurable I/O (Logic Command/Reference and up to four pairs of Datalinks) to meet application requirements.
- Parameter read/write access to configure and monitor parameter values over the network.
- User-defined fault actions to determine how the module and VTAC 9 drive respond to communication disruptions on the network.
- LonMark conformance tested.
- Flash-upgradability.

Compatible Products

The RECOMM-LON LonWorks Communications Options module is compatible with VTAC drives that support DPI. At the time of publication, compatible products include:

- VTAC 9 Drives

Required Equipment

Equipment Shipped with the Module

When you unpack the module, verify that the package includes:

- ❑ One RECOMM-LON LonWorks module
- ❑ A 2.54 cm (1 in.) and a 15.24 cm (6 in.) Internal Interface cable (only one cable is needed to connect the module to the drive)
- ❑ This manual
- ❑ Diskette containing resource files

User-Supplied Equipment

To install and configure the module, you must supply:

- ❑ A small flathead screwdriver
- ❑ LonWorks network cable to connect the module to the network. Refer to the LonMark Layers 1-6 Interoperability Guidelines, Appendix A “Cable Requirements for the TP/FT-10 Channel” for cable requirements.
- ❑ Configuration tools, such as:
  - – LCD OIM
  - – VS Utilities (version 3.01 or higher)
  - – LonMaker™ configuration software

Safety Precautions

Please read the following safety precautions carefully.

ATTENTION: Risk of injury or death exists. The VTAC 9 drive may contain high voltages that can cause injury or death. Remove power from the drive, and then verify power has been discharged before installing or removing a RECOMM-LON module.

ATTENTION: Risk of injury or equipment damage exists. Only personnel familiar with drive and power products and the associated machinery should plan or implement the installation, start up, configuration, and subsequent maintenance of the product using a module. Failure to comply may result in injury and/or equipment damage.

ATTENTION: Risk of equipment damage exists. The module contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the module. If you are unfamiliar with static control procedures, refer to *Guarding Against Electrostatic Damage*, Publication 8000-4.5.2.

ATTENTION: Risk of injury or equipment damage exists. If the module is transmitting control I/O to the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting a module.

ATTENTION: Risk of injury or equipment damage exists. **Parameter 6 - [Comm Flt Action]** lets you determine the action of the module and connected drive if communications are disrupted. By default, this parameter faults the drive. You can set this parameter so that the drive continues to run. Precautions should be taken to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

ATTENTION: Risk of injury or equipment damage exists. When a system is configured for the first time, there may be unintended or incorrect machine motion. Disconnect the motor from the machine or process during initial system testing.

ATTENTION: Risk of injury or equipment damage exists. **Parameter 7 - [RcvHrtBeat Time]** lets you determine how long it will take the module to detect network communication losses. By default, this parameter is set to 120 seconds. You can set it so that the duration is shorter, longer, or disabled. Take precautions to ensure that the setting does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

ATTENTION: Risk of injury or equipment damage exists. DPI host products must not be directly connected together via RECBL-xxx cables. Unpredictable behavior due to timing and other internal procedures can result if two or more devices are connected in this manner. Failure to observe this precaution could result in injury and/or damage to equipment.

ATTENTION: Risk of injury or equipment damage exists. The examples in this publication are intended solely for purposes of example. There are many variables and requirements with any application. Rockwell Automation, Inc. does not assume responsibility or liability (to include intellectual property liability) for actual use of the examples shown in this publication.

Quick Start

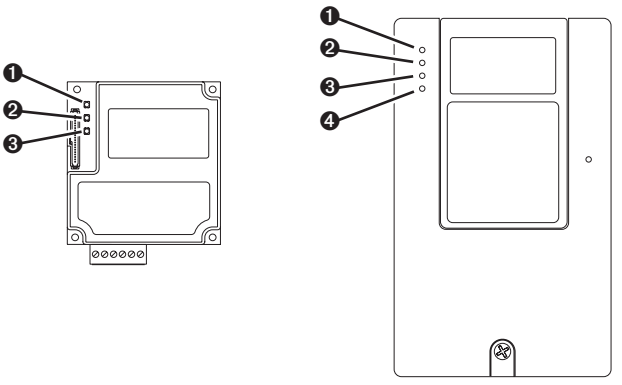
This section is provided to help experienced users quickly start using the module. If you are unsure how to complete a step, refer to the referenced chapter.

Step	Action	Refer to…
1	**Review the safety precautions for the module.**	Throughout this manual
2	**Verify that the VTAC 9 drive is properly installed.**	Drive User Manual
3	**Install the module.** Verify that the VTAC 9 drive and the network are not powered. Use the captive screws to secure and ground the module to the drive. Then, connect the module to the drive and to the network.	Chapter 2, Installing the Module
4	**Apply power to the module.** A. The module receives power from the drive. Verify that the module and network are installed correctly and then apply power to the drive. The Drive (topmost) status indicator should be solid green. Refer to Chapter 5, Troubleshooting for a description of the other LEDs. B. Configure/verify key drive parameters.	Chapter 2, Installing the Module
5	**Configure the module for your application.** Install and bind network variables. Set the parameters for the following features as required by your application: • I/O configuration • Fault actions	Chapter 3, Configuring the Module
6	**Set up the network to communicate with the module.** Use a network tool (such as LonMaker) to configure the module on the network.	Chapter 4, Configuring the LonWorks Network

Status Indicators

The module uses three status indicators to report its operating status. They can be viewed on the module or through the drive cover (Figure 1.2).

Figure 1.2 Status Indicators (location on drive may vary)



Item	Module Status Indicator Name
❶	Drive
❷	MS
❸	NET A
❹	NET B (not used)

After installing the module and applying power to the drive, refer to Start-Up Status Indications on page 2-5 for possible start-up status indications and their descriptions.

Notes:

Installing the Module

This chapter provides instructions for installing the RECOMM-LON module in a VTAC 9 drive.

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Preparing for an Installation

Before installing the module, verify that you have all required equipment. Refer to Required Equipment on page 1-3.

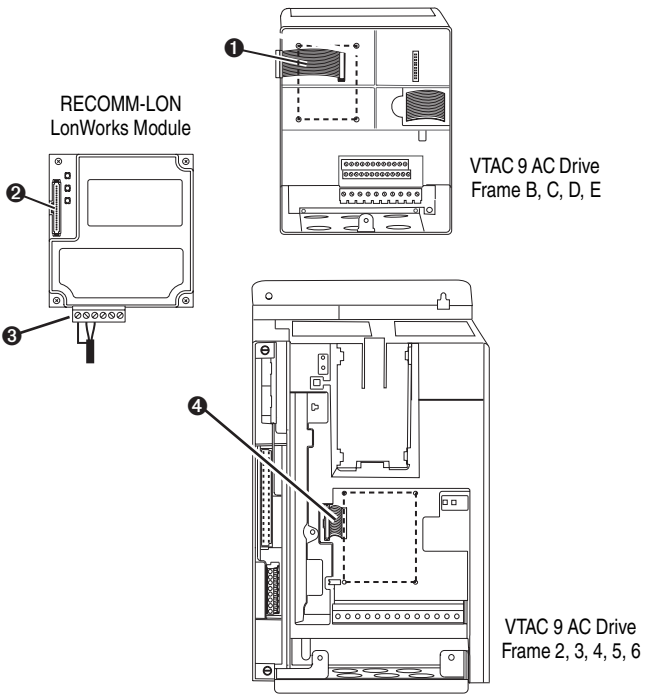
ATTENTION: Risk of equipment damage exists. The module contains ESD (Electrostatic Discharge) sensitive parts that can be damaged if you do not follow ESD control procedures. Static control precautions are required when handling the module. If you are unfamiliar with static control procedures, refer to *Guarding Against Electrostatic Damage*, Publication 8000-4.5.2.

Connecting the Module to the Drive

ATTENTION: Risk of injury or death exists. The VTAC 9 drive may contain high voltages that can cause injury or death. Remove power from the drive, and then verify power has been discharged before installing or removing the module.

1. Remove power from the drive and network.
2. Use static control precautions.
3. Remove the drive cover or open the drive door.
4. Connect the Internal Interface cable to the DPI port on the drive and then to the DPI connector on the module.

Figure 2.1 DPI Ports and Internal Interface Cables



Item	Description
❶	15.24 cm (6 in.) Internal Interface cable
❷	DPI Connector

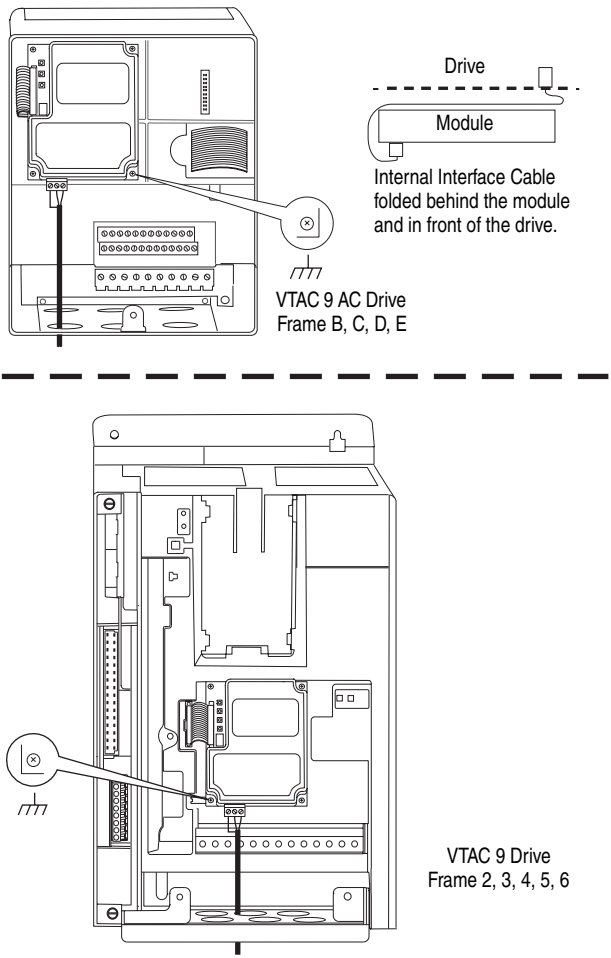
Item	Description
❸	Network cable
❹	2.54 cm (1 in.) Internal Interface cable

5. Secure and ground the module to the drive by doing the following:

- On VTAC 9 Frame B, C, D, and E drives, fold the Internal Interface cable behind the module and mount the module in the drive using the four captive screws.
- On VTAC 9 Frame 2, 3, 4, 5, and 6 drives, mount the module on the drive using the four captive screws.

Important: Tighten all screws to properly ground the module. Recommended torque is 0.9 N-m (8.0 lb.-in.).

Figure 2.2 Mounting and Grounding the Module

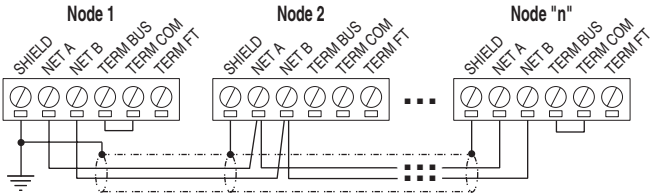


Connecting the Module to the Network

ATTENTION: Risk of injury or death exists. The VTAC 9 drive may contain high voltages that can cause injury or death. Remove power from the drive, and then verify power has been discharged before installing or removing the module.

1. Remove power from the drive.
2. Use static control precautions.
3. Connect a cable to the network, and route it through the bottom of the drive (see Figure 2.2). For cable information, refer to the LonMark Layers 1-6 Interoperability Guidelines, Appendix A "Cable Requirements for the TP/FT-10 Channel."
4. Connect the network cable to the six-pin linear plug (provided with the module). See Figure 2.3 for terminal designations and typical terminal connections.

Figure 2.3 Bus Topology with Shield Wiring Example



Term.	Name	Function
1	SHIELD (1)	Noise mitigation (2)
2	NET A	Network connection, polarity insensitive
3	NET B	Network connection, polarity insensitive
4	TERM BUS	Connect to TERM COM for termination of Bus (3) topology networks.
5	TERM COM	Termination common
6	TERM FT	Connect to TERM COM for termination of Free (4) topology networks.

(1) It is recommended to use shielded network cable. This shield must be grounded at one point on the network via a 470K ohm, 1/4 watt, ≤10% metal film resistor.

(2) For noise mitigation, LON® trunk lines should not be run in close proximity to drive or equipment power distribution feeds. When connecting to a VTAC 9 drive with option cabinet, run the LON trunk line directly to the drive power module — not through the option cabinet. See the VTAC 9 Drive User Manual for specific wiring locations.

(3) To terminate a Bus Topology network (one termination at each end of the network), connect TERM COM to TERM BUS.

(4) To terminate a Free Topology network (one termination per segment), connect TERM COM to TERM FT.

5. Insert the 6-pin linear plug into the mating module socket.

Applying Power

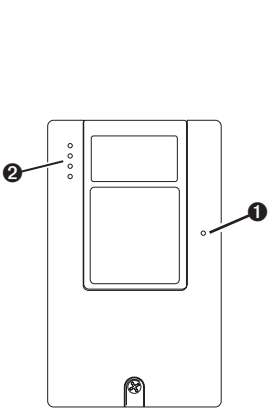
ATTENTION: Risk of equipment damage, injury, or death exists. Unpredictable operation may occur if you fail to verify that parameter settings are compatible with your application. Verify that settings are compatible with your application before applying power to the drive.

Install the drive cover or close the drive door, and apply power to the drive. The module receives its power from the connected drive. When you apply power to the module for the first time, its topmost "Drive" status indicator should be solid green after an initialization. If it is red, there is a problem. Refer to Chapter 5, Troubleshooting.

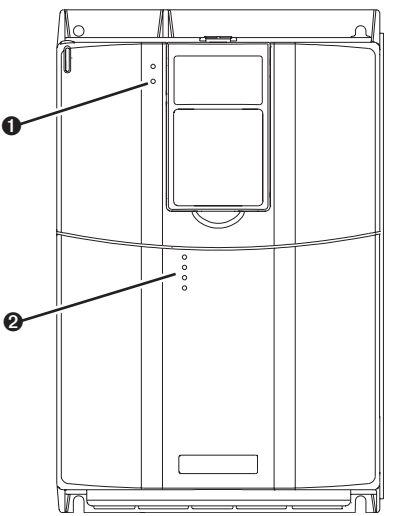
Start-Up Status Indications

Status indicators for the drive and communications module can be viewed on the front of the drive (Figure 2.4) after power has been applied. Possible start-up status indications are shown in Table 2.A.

Figure 2.4 Drive and Module Status Indicators (location on drive may vary)



Frames B through E



Frames 2 through 6

Table 2.A Drive and Module Start-Up Status Indications

Item	Name	Color	State	Description
Ready Status Indicator on Drive				
❶	Ready	Green	Flashing	Drive ready but not running, and no faults are present.
			Steady	Drive running, no faults are present.
		Yellow	Flashing, Drive Stopped	An inhibit condition exists – the drive cannot be started. Check drive Parameter 214 - [Start Inhibits].
			Flashing, Drive Running	An intermittent type 1 alarm condition is occurring. Check drive Parameter 211 - [Drive Alarm 1].
			Steady, Drive Running	A continuous type 1 alarm condition exists. Check drive Parameter 211 - [Drive Alarm 1].
		Red	Flashing	A fault has occurred.
			Steady	A non-resettable fault has occurred.
Communications Module Status Indicators				
❷	Drive	Green	Flashing	Normal Operation. The module is establishing an I/O connection to the drive. It will turn solid green or red.
			Steady	Normal Operation. The module is properly connected and communicating with the drive.
	MS	Green	Flashing	Normal Operation. The module is operating but is not transferring I/O data.
			Steady	Normal Operation. The module is operating and transferring I/O data.
	NET A	Green	Flashing	Normal Operation. The module is properly connected but does not have an I/O connection.
			Steady	Normal Operation. The module is properly connected and communicating on the network.

Configuring/Verifying Key Drive Parameters

The VTAC 9 drive can be separately configured for the control and Reference functions in various combinations. For example, you could set the drive to have its control come from a peripheral or terminal block with the Reference coming from the network. Or you could set the drive to have its control come from the network with the Reference coming from another peripheral or terminal block. Or you could set the drive to have both its control and Reference come from the network.

The following steps in this section assume that the drive will receive the Logic Command and Reference from the network.

1. Use drive Parameter 089 - [Logic Source Sel] to select the control method for your application requirements. For example, if the start source is to come from the network, set this parameter value to “5” (Network).

2. Use drive Parameter 090 - [Speed Ref A Sel] to set the drive speed Reference to “22” (Network).

3. Verify that drive Parameter 213 - [Speed Ref Source] is reporting that the source of the Reference to the drive is “22” (Network). This ensures that any Reference commanded from the network can be monitored by using drive Parameter 002 - [Commanded Freq]. If a problem occurs, this verification step provides the diagnostic capability to determine whether the drive/module or the network is the cause.

Notes:

Configuring the Module

This chapter provides instructions and information for setting the parameters in the module.

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For a list of parameters, refer to Appendix B, Module Parameters. For definitions of terms in this chapter, refer to the Glossary.

Configuration Tools

The module stores parameters and other information in its own Non-Volatile Storage (NVS) memory. You must, therefore, access the module to view and edit its parameters. The following tools can be used to access the module parameters:

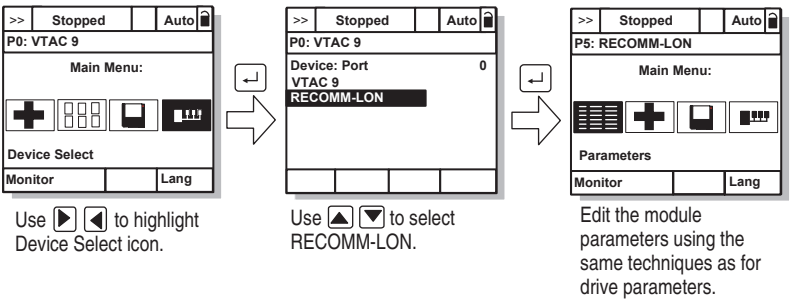
Tool	Refer to...
LCD OIM	page 3-2
VS Utilities Software	*VS Utilities Getting Results Manual*, and VS Utilities online help (installed with the software)
LonMaker configuration software	www.echelon.com

Using the LCD OIM

To access parameters in the module using the LCD OIM (Operator Interface Module), refer to the procedure in Figure 3.1.

If you are unfamiliar with the operation of the LCD OIM, refer to the VTAC 9 Drive User Manual for more information.

Figure 3.1 Accessing the Module Parameters Using the LCD OIM

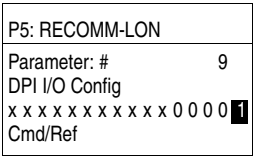


Setting the I/O Configuration

The I/O configuration determines the data that is sent to and from the drive. Logic Command/Status, Reference/Feedback, and Datalinks may be enabled or disabled. A “1” enables the I/O. A “0” disables the I/O.

1. Set the bits in **Parameter 9 - [DPI I/O Config]**.

Figure 3.2 Example I/O Configuration Screen on an LCD OIM



Bit	Description
0	Logic Command/Reference (Default)
1	Datalink A
2	Datalink B
3	Datalink C
4	Datalink D
5 - 15	Not Used

Bit 0 is the right-most bit. In Figure 3.2, it is highlighted and equals “1.”

2. If Logic Command/Reference is enabled, configure the parameters in the drive to accept the Logic Command and Reference from the module. For example, set Parameter 90 - [Speed Ref A Sel] in a VTAC 9 drive to “22” (Network) so that the drive uses the Reference from the module. Also, verify that drive Parameter 286 - [Manual Mask] is configured to receive the desired logic from the module. Refer to the documentation for your drive for details.

3. If you enabled one or more Datalinks, configure parameters in the drive to determine the source and destination of data in the Datalink(s). For example, configure the Datalinks in a VTAC 9 drive by setting Parameters 300 - [Data In A1] to 317 - [Data Out D2]. Also, ensure that the LonWorks module is the only module using the enabled Datalink(s). Refer to Datalink Ins on page 4-8 and Datalink Outs on page 4-12 for additional information.

4. Reset the module (see Resetting the Module on page 3-7).

The module is ready to send and receive I/O.

Setting a Comm Fault Action

By default, when communications are disrupted (for example, a cable is disconnected), the drive will remain in its current state (for example, a running drive will continue to run) until **Parameter 7 - [RcvHrtBeat Time]** has elapsed.

You can configure different responses to communications disruptions using **Parameter 6 - [Comm Flt Action]** and **Parameter 7 - [RcvHrtBeat Time]**.

ATTENTION: Risk of injury or equipment damage exists. **Parameter 6 - [Comm Flt Action]** and **Parameter 7 - [RcvHrtBeat Time]** let you determine the action of the module and connected drive if communications are disrupted. Take precautions to ensure that the setting of these parameters does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).

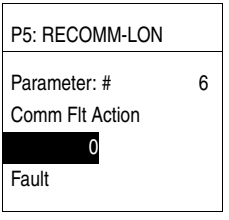
Changing the Comm Fault Action

Set the value of **Parameter 6 - [Comm Flt Action]** to the desired response action:

Value	Action (1)	Description
0	Fault	The drive is faulted and stopped. (Default)
1	Stop	The drive is stopped, but not faulted.
2	Zero Data	The drive is sent 0 for output data. This does not command a stop.
3	Hold Last	The drive continues in its present state.
4	Send Flt Cfg	The drive is sent the data that you set in the fault configuration parameters (**Parameters 11 - [Flt Cfg Logic]** through **20 - [Flt Cfg D2 In]**).

(1) Actual action taken requires **Parameter 7 - [RcvHrtBeat Time]** to have a value greater than "0" (zero).

Figure 3.3 Example Comm Fault Action Screen on an LCD OIM



Setting **Parameter 7 - [RcvHrtBeat Time]** to “0” (zero) disables the fault action, and a value greater than “0” (zero) enables the fault action. If nviDrvSpeedStpt is not received by the module within the **Parameter 7 - [RcvHrtBeat Time]** value, the fault action in **Parameter 6 - [Comm Flt Action]** will be taken.

Changes to these parameters take effect immediately. A reset is not required.

Setting the Idle Fault Action

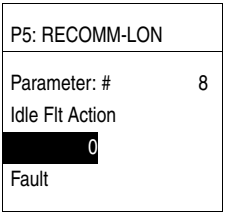
Parameter 8 - [Idle Flt Action] lets you determine the action of the module and connected drive when the node is taken offline.

Changing the Idle Fault Action

Set the value of **Parameter 8 - [Idle Flt Action]** to the desired response action:

Value	Action	Description
0	Fault	The drive is faulted and stopped. (Default)
1	Stop	The drive is stopped, but not faulted.
2	Zero Data	The drive is sent 0 for output data. This does not command a stop.
3	Hold Last	The drive continues in its present state.
4	Send Flt Cfg	The drive is sent the data that you set in the fault configuration parameters (**Parameters 11 - [Flt Cfg Logic]** through **20 - [Flt Cfg D2 In]**).

Figure 3.4 Example Idle Fault Action Screen on an LCD OIM



Changes to this parameter take effect immediately. A reset is not required.

Setting the Fault Configuration Parameters

If you set **Parameter 6 - [Comm Flt Action]** or **Parameter 8 - [Idle Flt Action]** to "4" (Send Flt Cfg), the values in the following parameters are sent to the drive after a communications fault occurs. You must set these parameters to values required by your application.

Parameter	Name	Description
11	Flt Cfg Logic	A 16-bit value sent to the drive for Logic Command.
12	Flt Cfg Ref	A 32-bit value (0 – 4294967295) sent to the drive as a Reference or Datalink. **Important:** If the drive uses a 16-bit Reference or 16-bit Datalinks, the most significant word of the value must be set to zero (0) or a fault will occur.
13 – 20	Flt Cfg x1 In or Flt Cfg x2 In	

Changes to these parameters take effect immediately. A reset is not required.

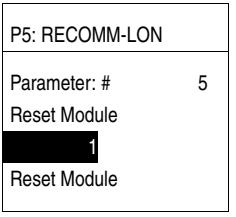
Resetting the Module

Changes to some module parameters require that you reset the module before the new settings take effect. You can reset the module by cycling power to the drive or by using **Parameter 5 - [Reset Module]**.

ATTENTION: Risk of injury or equipment damage exists. If the module is transmitting control I/O to the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting a connected module.

Set **Parameter 5 - [Reset Module]** to "1" (Reset Module).

Figure 3.5 Example Reset Screen on an LCD OIM



Value	Description
0	Ready (Default)
1	Reset Module
2	Set Defaults

When you enter "1" (Reset Module), the module will be immediately reset. When you enter "2" (Set Defaults), the module will set all module parameters to their factory-default settings. After performing a Set Defaults, enter "1" (Reset Module) so that the new values take effect. The value of this parameter will be restored to "0" (Ready) after the module is reset.

Viewing the Module Configuration

The following read-only parameters provide information about how the module is configured. You can view these parameters at any time.

No.	Name	Description
1	DPI Port	The port on the drive (usually port 5) to which the module is connected.
3	Ref/Fdbk Size	The size of the Reference/Feedback. It will either be 16 bits or 32 bits. It is set in the drive and the module automatically uses the correct size.
4	Datalink Size	The size of the Datalinks. It will either be 16 bits or 32 bits. It is set in the drive and the module automatically uses the correct size.
10	DPI I/O Active	The Reference/Feedback and Datalinks used by the module. This value is the same as **Parameter 9 - [DPI I/O Config]** unless the parameter was changed and the module was not reset.

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Ref
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

0 = Disabled
1 = Enabled
x = Reserved

Configuring the LonWorks Network

This chapter provides information about configuring network variables to access a VTAC 9 drive when using a LonWorks module.

Topic	Page
Overview of LonWorks Functionality	4-1
Operating the Drive Using a LonMark Profile	4-2
Node Operations	4-4
Network Variable Inputs (NVIs)	4-5
Network Variable Outputs (NVOs)	4-9
Network Configuration Inputs (NCIs)	4-13
Conditions Required for Operation	4-18
Resource Files	4-20

Overview of LonWorks Functionality

A network variable is a data item that a particular device application program expects to get from other devices on a network (*Network Variable Inputs*) or expects to make available to other devices on a network (*Network Variable Outputs*). Data exchange on a LonWorks network is handled with Standard Network Variable Types (SNVTs), which represent different types of standard data (for example, temperature, pressure, voltage, etc.).

When a program writes into one of its Network Variable Outputs, the new value of the network variable is propagated across the network to all nodes with Network Variable Inputs connected to that Network Variable Output. A network variable can only be bound to another network variable of the same type.

Specific network variables are described in:

- Network Variable Inputs (NVIs) on page 4-5
- Network Variable Outputs (NVOs) on page 4-9
- Network Configuration Inputs (NCIs) on page 4-13.

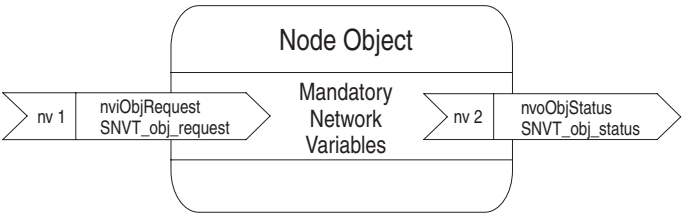
Important: Any changes made using the LCD OIM to a parameter that is also updated by the network will be overwritten when the next network update occurs.

Operating the Drive Using a LonMark Profile

A LonMark profile defines the functional profile for a node communicating with other nodes. The profile specifies which SNVTs (Standard Network Variable Types) and SCPTs (Standard Configuration Property Types) are used, and provides a semantic meaning about the information being communicated.

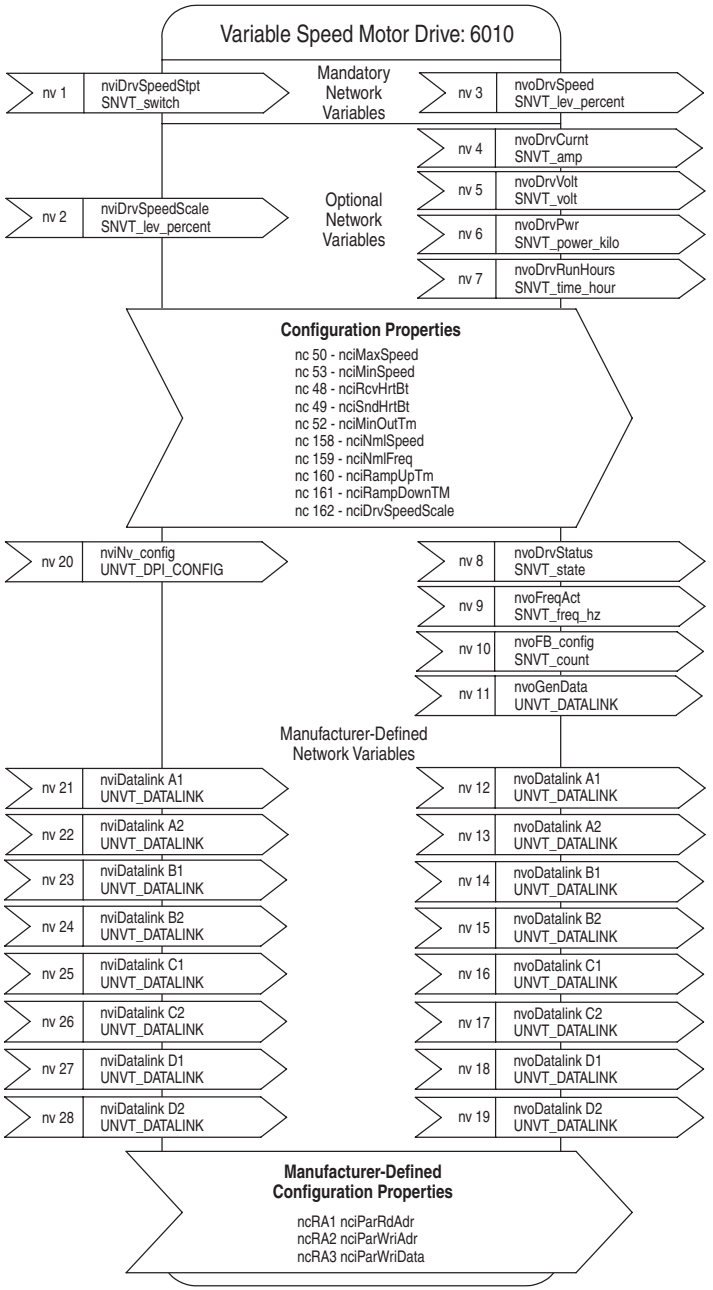
When a profile is implemented in a node, it is called a LonMark object. One node can have several objects implemented. The LonWorks module has two objects: a node object and a drive object. The node object (Figure 4.1) is used to control the other objects in a node.

Figure 4.1 Node Object



The drive object is based on a specific LonMark functional profile (“Variable Speed Motor Drive: 6010”) and is shown in Figure 4.2.

Figure 4.2 Drive Object



Node Operations

The following sections describe the basics of node operation.

WINK (What is a WINK?)

WINK is a network command that verifies communication with a node. The NET A indicator will flash to indicate that a WINK was received. The LED will flash red according to the following sequence:

- 3 fast flashes
- OFF for 1 second

This sequence is repeated 10 times.

If the Node is Offline

If a node is brought offline, it will not accept any NVI (Network Variable Inputs) settings or update NVOs (Network Variable Outputs). The module uses the setting in **Parameter 8 - [Idle Flt Action]** and issues a command to the drive. NCI (Network Configuration Input) variable updates will be accepted but not forwarded to the drive until the node goes online and/or is reset.

If the Node is Online

The node accepts NCI and NVI settings, and updates NVOs.

Network Variable Inputs (NVIs)

This section provides descriptions of the Network Variable Inputs.

Node Object Request

Variable: nviObjRequest

Format: SNVT_obj_request

Explanation: This Network Variable Input enables control commands and updates from the network to specific objects in the node. The identification number for the node is 0 and for the drive object is 1. The request functionality is the same for both objects. The setting of nviObjRequest does not affect the ability of setting drive speed. The status of the node is reported in nvoObjStatus (page 4-9).

Valid Range for Object ID: 0 and 1

Valid Range for Request:

- RQ_UPDATE_STATUS updates nvoObjStatus.
- RQ_CLEAR_STATUS clears nvoObjStatus.
- RQ_CLEAR_ALARM clears a fault in the drive.
- RQ_REPORT_MASK reports supported requests in nvoObjStatus.
- RQ_NORMAL is the normal request where the node functions as normal.
- RQ_DISABLE puts the node in a disabled state. It sets a Comm Loss Action to the drive. It does not respond to any updates received on Network Variable Inputs, but it supports writing of configuration properties (Network Configuration Inputs). A value written to a Network Variable Input in this state is not written to the drive. It will NOT be valid when the node is enabled again. In the disabled state, Network Variable Outputs (NVOs) are not propagated to the network. If the node was already in the disabled state, a request to disable the node is not an error. An event will be logged in the event list.
- RQ_ENABLE enables the node again after a disable request. An event will be logged in the event list.

All other requests are not supported, and any attempt to use them sets the invalid_request bit in nvoObjStatus.

Drive Speed Setpoint

Variable: nviDrvSpeedStpt

Format: SNVT_switch

Explanation: This Network Variable Input provides a low-resolution speed setpoint. The setpoint value consists of two elements: the requested speed and the drive state. When the drive state element of the nviDrvSpeedStpt variable is set to zero, the drive will stop.

Valid Range: 0.0-100.0 (in 0.5% increments) followed by a space and either a “0” (STOP), “1” (RUN), or “-1” (AUTO) drive state.

nviDrvSpeedStpt Value		nviSpeedScale Value (%)	Resulting Speed
Requested Speed (%)	Drive State		
n/a	0 (STOP)	n/a	STOPPED
0.0	1 (RUN)	n/a	RUNNING at 0%
0.5-99.5	1 (RUN)	Effect speed and running direction	Equals nviDrvSpeedStpt Value times nviDrvSpeedScale Value
n/a	-1 (AUTO)	n/a	AUTO (Invalid)

Scaling: See table above and Adjusting the Frequency Setting on page 4-18.

Default Value: -1 (state = AUTO). This value is adapted at power up. This Network Variable Input may use **Parameter 7 - [RcvHrtBeat Time]** if this function is set up for use.

Speed Setpoint Scaling

Variable: nviDrvSpeedScale

Format: SNVT_lev_percent

Explanation: This Network Variable Input provides scaling for nviDrvSpdStpt. For example, if nviDrvSpeedStpt value is 100.0% and nviDrvSpeedScale value is -150.000%, then actual speed setpoint value is -150.000% (reverse direction at 1.5 times nominal speed).

Valid range: -163.840 to +163.830%

Scaling: See Drive Speed Setpoint on page 4-6 and Adjusting the Frequency Setting on page 4-18.

Default Value: Defined by nciDrvSpeedScale

Module Configuration

Variable: nviNV_config

Format: UNVT_DPI_CONFIG

Explanation: This Network Variable Input provides information on how parameters should be mapped to network variables. The NVI contains two fields:

- NV_index
- DPI_parameter

An existing configuration can be checked using the following procedures:

- To check which DPI parameter a network variable is connected to, use nviNV_config with the following data:

  UNVT_DPI_CONF.NV_index = NV_index to check
  UNVT_DPI_CONF.DPI_parameter = 65535 (decimal)

- To check which network variable a DPI parameter is connected to, use nviNV_config with the following data:

  UNVT_DPI_CONF.NV_index = 255 (decimal)
  UNVT_DPI_CONF.DPI_parameter = DPI parameter to check

The result of the requests above are placed in nvoFB_config. If there is no configuration available, 0 (zero) is returned.

Valid Range:

NV_index out: 14-20.

LON SNVT	NV_Index	Default VTAC 9 Drive Parameter
nvoDrvSpeed	14	1
nvoDrvCurnt	15	3
nvoDrvPwr	17	7
nvoDrvVolt	18	6
nvoDrvRunHours	19	10
nvoDrvFreqAct	20	1

NV_index in: 31-36.

LON SNVT	NV_Index	Default VTAC 9 Drive Parameter
nciNmlSpeed	31	44
nciMinSpeed	32	81
nciMaxSpeed	33	55
nciRampUpTm	34	140
nciRampDownTime	35	142
nciNmlFreq	36	43

Default Value: This configuration is the default for VTAC 9 drives. For other future drives, the defaults are "0" (zero) and need to be configured prior to network commissioning. A value of "0" (zero) means the variable is disabled and cannot be used to send/receive data.

Important: It is necessary to configure nciNmlFreq and nciMaxSpeed to operate the drive from the network.

Datalink Ins

Variable: nviDatalinkA1
nviDatalinkA2
nviDatalinkB1
nviDatalinkB2
nviDatalinkC1
nviDatalinkC2
nviDatalinkD1
nviDatalinkD2

Format: UNVT_DATALINK

Explanation: These Network Variable Inputs are used for generic parameter writes using Datalink Ins. To set up a Datalink, configure the module according to the drive manual. All data is sent in raw format; that is, no scaling is performed.

Example: If VTAC 9 drive Parameter 300 - [Data In A1] is set to "101," it is pointing to Parameter 101 - [Preset Speed 1]. Any value written to nviDatalinkA1 will update Parameter 101 - [Preset Speed 1] with the value. A value of "100" equates to 10.0 Hz (note no scaling is performed).

Network Variable Outputs (NVOs)

This section describes the Network Variable Outputs, which are read-only values. No output values are sent over the network, unless they have changed (except nvoDrvSpeed, which is sent for the heartbeat functionality, and nvoObjStatus, if update status is requested).

Node Object Status

Variable: nvoObjStatus

Format: SNVT_obj_status

Explanation: This Network Variable Output reports node object status (bit field) and is updated every time its status changes (see Node Object Request on page 4-5).

Valid Range:

Bit	Name	Description
1	Invalid_ID	The node has been asked for an invalid object ID.
2	Invalid_request	The node has been asked for an unsupported request.
3	Disabled	Object disabled.
6	Out_of_service	The drive is not supported. The Lon module has detected an unknown drive. It will not attempt to communicate on DPI.
13	Comm_failure	No contact with DPI.
16	Locked_out	The initial Neuron® processor state after a reset.
17	Manual_control	The drive is not fully controlled from the LonWorks peripheral.
18	In_alarm	The drive is faulted.
20	Report_mask	Report supported fields.

Drive Status

Variable: nvoDrvStatus

Format: SNVT_state

Explanation: This Network Variable Output provides the status of the drive via the Logic Status word (see Logic Status Word on page C-2).

Scaling: Bit 0 in the drive is bit 0 (most significant bit) in this variable when it is viewed using the SNVT_state format (default). SNVT_state bits, shown in the LonMaker Browser window, are numbered from left to right.

Drive Current

Variable: nvoDrvCurnt

Format: SNVT_amp

Explanation: This Network Variable Output provides the drive output current in Amps.

VTAC 9 Drive Parameter Equivalent: Parameter 3 - [Output Current], which can be mapped using the nviNV_config variable or module **Parameter 24 - [DrvCurntParam]**.

Drive Speed

Variable: nvoDrvSpeed

Format: SNVT_level_percent

Explanation: This Network Variable Output provides the speed of the drive as a percentage of the nominal speed. It is also used as a heartbeat to monitor the health of the LonWorks communication interface.

Scaling: nciNmlFrq ÷ (nvoFreqAct * run_dir) = nvoDrvSpeed

The run_dir value is bit 3 of the driveLogic Status word. If rotation direction is forward, then run_dir will be a positive value. If reverse, then run_dir will be a negative value.

VTAC 9 Drive Parameter Equivalent: Parameter 1 - [Output Freq], which can be mapped using the nviNV_config variable or module **Parameter 23 - [DrvSpeedParam]**.

Drive Power

Variable: nvoDrvPwr

Format: SNVT_power_kilo

Explanation: This Network Variable Output provides the drive power in kilowatts.

VTAC 9 Drive Parameter Equivalent: Parameter 7 - [Output Power], which can be mapped using the nviNV_config variable or module **Parameter 25 - [DrvPwrParam]**.

Drive Voltage

Variable: nvoDrvVolt

Format: SNVT_volt

Explanation: This Network Variable Output provides the drive output voltage in volts.

VTAC 9 Drive Parameter Equivalent: Parameter 6 - [Output Voltage], which can be mapped using the nviNV_config variable or module **Parameter 26 - [DrvVoltParam]**.

Output Frequency

Variable: nvoFreqAct

Format: SNVT_freq_hz

Explanation: This Network Variable Output provides the drive output frequency in Hz. This value is always positive (does not indicate the forward/reverse direction of revolution).

VTAC 9 Drive Parameter Equivalent: Parameter 1 - [Output Freq], which can be mapped using the nviNV_config variable or module **Parameter 28 - [DrvFreqActParam]**.

Operation Hour Counter

Variable: nvoDrvRunHours

Format: SNVT_time_hour

Explanation: This Network Variable Output provides the drive total running time in whole hours.

VTAC 9 Drive Parameter Equivalent: Parameter 10 - [Elapsed Run Time], which can be mapped using the nviNV_config variable or module **Parameter 27 - [DrvRunHoursParam]**.

Configuration Feedback

Variable: nvoFB_config

Format: SNVT_count

Explanation: This Network Variable Output is used to verify that the configuration of the module is OK. When changing the configuration with the nviNV_config variable, nvoFB_config responds with the NV_index that was updated.

Datalink Outs

Variable: nvoDatalinkA1
nvoDatalinkA2
nvoDatalinkB1
nvoDatalinkB2
nvoDatalinkC1
nvoDatalinkC2
nvoDatalinkD1
nvoDatalinkD2

Format: UNVT_DATALINK

Explanation: These Network Variable Outputs are used for generic parameter inputs using Datalink Outs. To set up a Datalink, configure the module according to the drive manual. All data is sent in raw format; that is, no scaling is performed.

Example: If VTAC 9 drive Parameter 310 - [Data Out A1] is set to "16," it is pointing to Parameter 16 - [Analog In 1 Value]. The value in Parameter 16 - [Analog In 1 Value] will be read in nvoDatalinkA1. A value of "1000" equates to 1.000 mA or volt (note no scaling is performed).

Generic Parameter Data

Variable: nvoGenData

Format: UNVT_DATALINK

Explanation: This Network Variable Output provides data from the parameter number defined by nciParRdAdr.

Scaling: No scaling is performed and all data is presented in raw format.

Parameter Mapping: nciParRdAdr

Network Configuration Inputs (NCIs)

The values of the NCIs change when written to and keep their values after a power cycle.

All NCIs, with a corresponding parameter in the drive, are read from the drive after reset and when going from offline to online. When the parameter is updated from the network, it is written to the drive.

Send Heartbeat

NCI: nciSndHrtBt

Format: SNVT_time_sec

Explanation: This Network Configuration Input sets the maximum send time for the variable nvoDrvSpeed.

Valid Range: 0.0 - 6553.4 seconds

Default Value: 0.0 seconds (disabled)

Receive Heartbeat

NCI: nciRcvHrtBt

Format: SNVT_time_sec

Explanation: This Network Configuration Input sets the maximum time that is allowed to elapse between updates of the Network Variable Input nviDrvSpeedStpt. Setting nciRcvHrtBt to 0.0 seconds disables the Receive Heartbeat function. If a timeout occurs, the module will issue the fault action set in **Parameter 6 - [Comm Flt Action]**. A timeout cannot occur before the reception of the first nviDrvSpeedStpt update.

Valid Range: 0.0 - 6553.4 seconds.

Default Value: 120.0 seconds

Minimum Send Time

NCI: nciMinOutTm

Format: SNVT_time_sec

Explanation: This Network Configuration Input sets the minimum period of time that expires before the Network Variable Outputs can be re-sent. All variables are updated if they changed at each period end. This is good for limiting use of bandwidth on the LonWorks network. Setting nciMinOutTm to 0.0 seconds disables transmission limiting.

Valid Range: 0.0 - 6553.4 seconds.
Default Value: 0.0 seconds (disabled)

Motor Nominal Speed

NCI: nciNmlSpeed

Format: SNVT_rpm

Explanation: This Network Configuration Input sets the nominal speed of the drive in RPMs.

Default Value: 1740 RPM

VTAC 9 Drive Parameter Equivalent: Parameter 44 - [Motor NP RPM], which can be adjusted using the nviNV_config variable or module **Parameter 30 - [NmlSpeedParam]**.

Nominal Frequency

NCI: nciNmlFreq

Format: SNVT_freq_hz

Explanation: This Network Configuration Input sets the nominal frequency of the drive output in Hz. This also affects commanded drive speed. For more information, see Drive Speed Setpoint on page 4-6 and Speed Setpoint Scaling on page 4-6.

Valid Range: 10.0 - 400.0 Hz
Default Value: 60 Hz.

VTAC 9 Drive Parameter Equivalent: Parameter 43 - [Motor NP Hertz], which can be adjusted using the nviNV_config variable or module **Parameter 29 - [NmlFreqParam]**.

Minimum Speed

NCI: nciMinSpeed

Format: SNVT_lev_percent

Explanation: This Network Configuration Input limits the minimum speed that can be set from the network to the drive. The value is entered as a percentage of nominal frequency as defined by the Nominal Frequency (nciNmlFreq) configuration value. For example, if nciNmlFreq = 50 Hz and nciMinSpeed = 10.000%, the minimum speed is 5 Hz.

Valid Range: The minimum speed value is validated as follows:

-163.840% ≤minimum speed ≤maximum speed ≤163.830%

Default Value: 0.000%

VTAC 9 Drive Parameter Equivalent: Parameter 81 - [Minimum Speed], which can be adjusted using the nviNV_config variable or module **Parameter 32 - [MinSpeedParam]**.

Maximum Speed

NCI: nciMaxSpeed

Format: SNVT_lev_percent

Explanation: This Network Configuration Input limits the maximum speed that can be set from the network to the drive. The value is entered as a percentage of nominal frequency as defined by the Nominal Frequency (nciNmlFreq) configuration value. For example, if nciNmlFreq = 50 Hz. and nciMaxSpeed = 125.000%, the maximum speed is 62.5 Hz.

Valid Range: The maximum speed value is validated against the value of the minimum speed as follows:

-163.840% ≤minimum speed ≤maximum speed ≤163.830%

Default Value: 100.000%

VTAC 9 Drive Parameter Equivalent: Parameter 55 - [Maximum Freq], which can be adjusted using the nviNV_config variable or module **Parameter 31 - [MaxSpeedParam]**.

Ramp Up Time

NCI: nciRampUpTm

Format: SNVT_time_sec

Explanation: This Network Configuration Input sets the acceleration time. The value specifies the length of time it will take to bring the inverter from stop to maximum frequency.

Valid Range: 0.1 - 3600.0 seconds

Default Value: 20.0 seconds

VTAC 9 Drive Parameter Equivalent: Parameter 140 - [Accel Time], which can be adjusted using the nviNV_config variable or module **Parameter 33 - [RampUpTmParam]**.

Ramp Down Time

NCI: nciRampDownTm

Format: SNVT_time_sec

Explanation: This Network Configuration Input sets the deceleration time. The value specifies the length of time it will take to bring the inverter to a stop when running at maximum frequency.

Valid Range: 0.1 - 3600.0 seconds

Default Value: 20.0 seconds

VTAC 9 Drive Parameter Equivalent: Parameter 142 - [Decel Time], which can be adjusted using the nviNV_config variable or module **Parameter 34 - [RampDownTmParam]**.

Speed Setpoint Scaling Default Value

NCI: nciDrvSpeedScale

Format: SNVT_lev_percent

Explanation: This Network Configuration Input sets a default value to nviDrvSpeedScale on every drive power cycle.

Valid Range: -163.000 to +163.000%

Default Value: 0.000%

Generic Parameter Read Address

NCI: nciParRdAdr

Format: SNVT_count

Explanation: This Network Configuration Input is used to read any parameter in the drive. The data is read via the nvoGenData output.

Valid Range: Any valid drive parameter.
Default Value: 0 (Not used)

Generic Parameter Write Address

NCI: nciParWriAdr

Format: SNVT_count

Explanation: This Network Configuration Input is used to set the drive parameter number to which a write operation should be performed. The drive parameter must be a writable parameter. The actual data value is collected from nciParWriData. The write operation is triggered only when nciParWriData is updated. The write operation is not triggered if nciParWriAdr is updated.

ATTENTION: Risk of equipment damage exists. Writing to a parameter using this method causes a Non-Volatile Storage (NVS) update (EEPROM write cycle). By using this method to frequently write parameter data, the NVS will quickly exceed its life cycle and cause the drive to malfunction. For this reason, do not frequently write parameter data using this method. Datalinks do not write to NVS and should be used for frequently changed parameters.

Valid Range: Any valid drive parameter.
Default Value: 0 (Not used)

Generic Parameter Write Data

NCI: nciParWriData

Format: UNVT_DATALINK

Explanation: This Network Configuration Input is the raw data value that will be written to the drive parameter set in nciParWriAdr. The module will not scale the value.

Valid Range: Dependent on drive parameter
Default Value: 0

Conditions Required for Operation

This section describes what conditions are required for performing some common actions and how the combination of SNVTs and SCPTs affects the operation of the drive.

Starting the Drive

The drive will RUN if the drive state element in the Network Variable Input nviDrvSpeedStpt is set to “1.”

Stopping the Drive

The drive will stop and use the default stop mode if the drive state element in the Network Variable Input NviSpeedStpt is set to “0” (zero). When the node is brought offline or disabled, the drive will take the idle fault response action set in module **Parameter 8 - [Idle Flt Action]**.

Adjusting the Frequency Setting

The actual value written to the drive equals:

nciNmlFreq * (nviDrvSpeedStpt ÷ 100) * (nviDrvSpeedScale ÷ 100)

Explanation: Nominal frequency is the basis for speed setpoint and speed scale percent values. For more information, see Drive Speed Setpoint on page 4-6 and Speed Setpoint Scaling on page 4-6.

nviDrvSpeedStpt Value		nviSpeedScale Value (%)	Resulting Speed
Requested Speed (%)	Drive State		
0.0	1 (RUN)	0.000	0 Hz (RUN)
0.0	1 (RUN)	100.000	0 Hz (RUN)
100.0	1 (RUN)	0.000	0 Hz (RUN)
100.0	0 (STOP)	150.000	(Normal) STOP
100.0	1 (RUN)	150.000	1.0 * 1.5 * NomFreq (RUN)
100.0	1 (RUN)	-75.000	1.0 * -0.75 * NomFreq (RUN)
50.0	1 (RUN)	150.000	0.5 * 1.5 * NomFreq (RUN)

Resetting Faults

If an error occurs, the drive faults. After removing the cause of the fault and setting nviObjRequest to RQ_CLEAR_ALARM, the drive can be reset.

nciMinOutTm versus nciSendHrtBt

The nciMinOutTm has priority over nciSendHrtBt. This means that heartbeats will not be sent as often as specified in nciSendHrtBt if nciMinOutTm has a longer time set.

Error Handling

If nciRcvHrtBt is larger than zero, and heartbeats are not received within the nciRcvHrtBt time, then communication with the LonWorks network is considered disrupted. The module response to loss of communication depends on the setting of module **Parameter 6 - [Comm Flt Action]**.

Refer to Chapter 5, Troubleshooting for more information on potential problems with the module and network.

Resource Files

LonMark resource files define the components of the external interface for a LonWorks device. These files allow installation tools and operator interface applications to interpret data produced by a device and to correctly format data sent to a device. They also help a system integrator or system operator to understand how to use a device and to control the LonMark objects on a device.

The LonWorks module uses three types of resource files:

- **Type File (.TYP) -** Defines network variable, configuration property, and enumerated types. LonMark standard network variable and configuration property types are defined in the STANDARD.TYP file. Type files have a .TYP extension.

- **Functional Profile Template (.FPT) -** Defines functional profiles that are used for describing LonMark objects. A functional profile specifies the mandatory and optional network variable and configuration property components of a LonMark object. LonMark standard functional profiles are defined in the STANDARD.FPT file. Functional profile templates have a .FPT extension.

- **Format File (.FMT) -** Defines display and input formats for network variable and configuration property types defined in a type file. Formats for the LonMark standard network variable and configuration property types are defined in the STANDARD.FMT file. Format files have a .FMT extension.

In addition to the resource files, these other file types are also used:

- **Language File -** Defines language-dependent strings. There is a separate language file for each supported language. The supported language file determines the extension of a language file. Two language files are currently available for the LonMark standard type files; these are STANDARD.ENU for American English and STANDARD.ENG for British English.

- **XIF File -** Defines the external interface for a LonWorks device. This file contains self-documentation information, number of address table entries, number of message tags, and the number, types, and directions of network variables.

The resource files and XIF file are shipped with the LonWorks module on a disk.

Troubleshooting

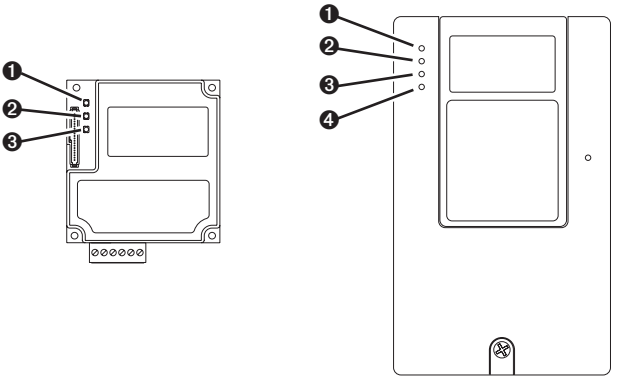
This chapter provides information for diagnosing and troubleshooting potential problems with the module.

Topic	Page
Understanding the Status Indicators	5-1
Drive Status Indicator	5-2
MS Status Indicator	5-3
NET A Status Indicator (Service Indicator)	5-3
Viewing Module Diagnostic Items	5-4
Viewing and Clearing Events	5-6

Understanding the Status Indicators

The module has three status indicators. They can be viewed on the module or through the drive cover. See Figure 5.1.

Figure 5.1 Status Indicators (location on drive may vary)



Item	Status Indicator	Description	See Page...
1	Drive	DPI Connection Status	5-2
2	MS	Module Status	5-3
3	NET A	LonWorks Communication Status	5-3
4	NET B	Not used for LonWorks	n/a

Drive Status Indicator

The Drive status LED indicates the status of the DPI interface between the module and the drive.

State	Cause	Corrective Actions
Off	The module is not powered or is not connected properly to the drive.	• Securely connect the module to the drive using the Internal Interface ribbon cable. • Apply power to the drive.
Flashing Red	The module is not receiving a ping message from the drive or the drive is faulted.	• Verify that cables are securely connected and not damaged. Replace cables if necessary. • Cycle power to the drive.
Solid Red	The drive has refused an I/O connection from the module. Another DPI peripheral is using the same DPI port as the module.	**Important:** Cycle power the drive after making any of the following corrections. • Verify that all DPI cables on the drive are securely connected and not damaged. Replace cables if necessary. • Configure the module and drive to use a Datalink that is not already being used by another peripheral.
Orange	The module is connected to a drive that is not supported by the module's firmware.	Use a VTAC 9 drive.
Flashing Green	The module is establishing an I/O connection to the drive or I/O has been disabled.	• Verify the settings of module **Parameter 9 - [DPI I/O Cfg]**. • Normal behavior if all I/O is disabled in module **Parameter 9 - [DPI I/O Cfg]**.
Solid Green	The module is properly connected and communicating with the drive.	No action required.

MS Status Indicator

The MS status LED reports the status of the communication module.

State	Cause	Corrective Actions
Off	The module is not powered.	• Securely connect the module to the drive using the Internal Interface ribbon cable. • Apply power to the drive.
Flashing Red: 2 Hz.	The Minimum Send Time (nciMinOutTm) on the sending node is less than the node's Send Heartbeat time (nciSndHrtBt).	Adjust the values of nciMinOutTm and nciSndHrtBt to match each other.
3 Red Flashes... then Constant Red	The module firmware has detected a RAM checksum error.	Cycle power to the drive.
6 Red Flashes... then Constant Red	The module firmware has detected a Flash checksum error.	Reflash the module.
Flashing Red: 8 Hz.	The module CPU cannot communicate with the Neuron Chip.	Cycle power to the drive.
Solid Red	The module has failed the hardware test.	• Cycle power to the drive. • Replace the module.
Flashing Green	The module is operational, but is not transferring I/O data.	• Program the controller to recognize and transmit I/O to the module. • Normal behavior if all I/O has been disabled in module **Parameter 9 - [DPI I/O Cfg]**.
Solid Green	The module is operational and transferring I/O data.	No action required.

NET A Status Indicator (Service Indicator)

The NET A status LED indicates the status of the LonWorks interface, which is controlled by the Neuron Chip.

State	Cause	Corrective Actions
Off	The node is configured.	No action required.
Solid Green	The node has no application program.	The Neuron Chip must be loaded with a new application program.
Flashing Red	WINK command received.	No action required.
Flashing Green	The node is not configured.	Configure the node.

Viewing Module Diagnostic Items

If you encounter unexpected communications problems, the module's diagnostic items may help you or Rockwell Automation personnel troubleshoot the problem. The following module diagnostic items can be viewed using an LCD OIM or VS Utilities (version 3.01 or higher) software. Diagnostic items show present data being transmitted and received by the drive and other diagnostic information regarding the LonWorks module.

No.	Name	Description
1	Common Logic Cmd	The present value of the Common Logic Command being transmitted to the drive by this module.
2	Prod Logic Cmd	The present value of the Product Logic Command being transmitted to the drive by this module.
3	Reference	The present value of the Reference being transmitted to the drive by this module. Note that a 16-bit value will be sent as the Most Significant Word of the 32-bit field with the Least Significant Word set to a value of zero (0).
4	Common Logic Sts	The present value of the Common Logic Status being received from the drive by this module.
5	Prod Logic Sts	The present value of the Product Logic Status being received from the drive by this module.
6	Feedback	The present value of the Feedback being received from the drive by this module. Note that a 16-bit value will be sent as the Most Significant Word of the 32-bit field with the Least Significant Word set to a value of zero (0).
7 8 9 10 11 12 13 14	Datalink A1 In Datalink A2 In Datalink B1 In Datalink B2 In Datalink C1 In Datalink C2 In Datalink D1 In Datalink D2 In	The present value of the respective Datalink In being transmitted to the drive by this module. If not using a Datalink, this diagnostic item should have a value of zero (0). If the drive indicates a 16-bit Datalink size, the Datalink value appears in the least significant 16 bits of this diagnostic item, and the most significant 16 bits of the diagnostic item are zero (0).
15 16 17 18 19 20 21 22	Datalink A1 Out Datalink A2 Out Datalink B1 Out Datalink B2 Out Datalink C1 Out Datalink C2 Out Datalink D1 Out Datalink D2 Out	The present value of the respective Datalink Out being received from the drive by this module. If the drive indicates a 16-bit Datalink size, the Datalink value appears in the least significant 16 bits of this diagnostic item, and the most significant 16 bits are zero (0).
23	Field Flash Cntr	The present value of the Field Flash Counter (the number of times this device has been flash updated).
24	DPI Tx Err Cntr	The present value of the DPI CAN Transmit Error Counter.
25	DPI Rx Err Cntr	The present value of the DPI CAN Receive Error Counter.
26	LON Tx Err	CRC errors detected during packet reception.
27	LON Lost Msg	Number of incoming packets that have been discarded due to no available application buffers.

No.	Name	Description
28	Last Reset Cause	0 = Power Up 1 = External 2 = Watchdog 3 = Software 4 = Cleared
29	Neuron State	The state of the Neuron Chip: 0 = appl_uncnfg 1 = cnfg_online 2 = unknown 3 = cnfg_offline 4 = soft_online
30	Neuron Chip ID	The Neuron Chip ID number as an enumerated value.
31	nviDrvSpdSp.val	The last reported requested speed element of nviDrvSpdStpt to the module from the network.
32	nviDrvSpdSp.st	The last reported drive state element of nviDrvSpdStpt to the module from the network.
33	nviDrvSpeedScale	The last nviDrvSpeedScale reported to the module from the network.
34	nvoDrvSpeed	The present drive speed propagated to the network nvoDrvSpeed variable.

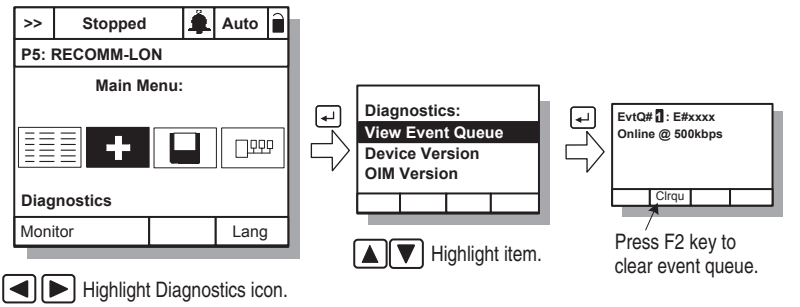
Viewing and Clearing Events

The module maintains an event queue that reports the history of its actions. You can view the event queue using an LCD OIM or VS Utilities (version 3.1 or higher) software.

To View and Clear Events

Use the procedure shown in Figure 5.2 to access the event queue using the LCD OIM. Note that you must have the RECOMM-LON module as the selected device to access its event queue.

Figure 5.2 Viewing and Clearing Events Using an LCD OIM



Events

Many events in the event queue occur under normal operation. If you encounter unexpected communications problems, the events may help you or Rockwell Automation personnel troubleshoot the problem. The following events may appear in the event queue:

Code	Event	Description
1	No Event	Empty event queue entry.
2	DPI Bus Off Flt	A bus off condition was detected on DPI. This event may be caused by loose or broken cables or by noise.
3	Ping Time Flt	A ping message was not received on DPI within the specified time.
4	Port ID Flt	The debounced DPI PIN ID was read as 0 or 7 after the module had completed start up.
5	Port Change Flt	The debounced DPI PIN ID has changed after the module had completed start up.
6	Host Sent Reset	The drive issued a reset event.
7	EEPROM Sum Flt	Start-up sequence detected corrupt EEPROM storage.

Code	Event	Description
8	Online @ 125 kbps	The module detects that the host is at 125 kbps.
9	Online @ 500 kbps	The module detects that the host is at 500 kbps.
10	Bad Host Flt	The module was connected to an incompatible drive.
11	Dup Port Flt	Another peripheral with the same port number is already in use.
12	Type 0 Login	The module has logged in for Type 0 control.
13	Type 0 Time Flt	The module has not received a Type 0 status message within the specified time.
14	DL Login	The module has logged into a Datalink.
15	DL Reject Flt	The drive rejected an attempt to log in to a Datalink.
16	DL Time Flt	The module has not received a Datalink message within the specified time.
17	Control Disabled	The module has sent a “Soft Control Disable” command to the drive.
18	Control Enabled	The module has sent a “Soft Control Enable” command to the drive.
19	Normal Startup	The module successfully started up.
20	Message Timeout	A client-server message sent by the module was not completed within 1 second.
21	DPI Fault Msg	The DPI drive has faulted.
22	DPI Fault Clear	The user cleared a fault in the module.
23	Net Comm Flt	The module detected a communication fault on the network (received heartbeat timeout.)
24	Fault Cfg Error	The module detected a 32-bit fault configuration reference when the drive supports only a 16-bit reference; or detected a 32-bit fault configuration Datalink value when the drive supports only 16-bit Datalinks.
25	LON Online	The module is on-line with the LonWorks network.
26	LON Offline	The module is off-line with the LonWorks network.
27	LON Reset	The module has detected a reset of the Neuron Chip.
28	LON Enabled	The node is enabled by RQ_ENABLE.
29	LON Disabled	The node is disabled by RQ_DISABLE.
30	Language CRC Bad	The segment of flash holding the text translations has a bad CRC.

Notes:

Specifications

Appendix A presents the specifications for the module.

Topic	Page
Communications	A-1
Electrical	A-1
Mechanical	A-1
Environmental	A-2
Regulatory Compliance	A-2

Communications

Network	
Protocol	LonWorks
Data Rate	78 kbps

Electrical

Consumption	
Drive	200 mA at 5 VDC supplied through the drive
Network	None

Mechanical

Dimensions	
Height	20 mm (0.79 in.)
Length	86 mm (3.33 in.)
Width	78.5 mm (3.09 in.)
Weight	85 g (3 oz.)

Environmental

Temperature Operating Storage	 -15 to 70° C (5 to 158° F) -40 to 85° C (-40 to 185° F)
Relative Humidity	5 to 95% non-condensing
Atmosphere	**Important:** The module **must not** be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the module is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.

Regulatory Compliance

Certification	Specification
UL	UL508C
cUL	CAN / CSA C22.2 No. 14-M91
CE	EN61800-6-4: 2001, EN61000-6-2: 2001

NOTE: In a domestic environment this product may cause radio interference in which case supplementary mitigation measures may be required.

Module Parameters

Appendix B provides information about the module parameters.

Topic	Page
About Parameter Numbers	B-1
Parameter List	B-1

About Parameter Numbers

The parameters in the module are numbered consecutively. However, depending on which configuration tool you use, they may have different numbers.

Configuration Tool	Numbering Scheme
• OIM • VS Utilities	The module parameters begin with parameter 01. For example, **Parameter 01 - [DPI Port]** is parameter 01 as indicated by this manual.
• Explicit Messaging	Refer to Chapter 4, Configuring the LonWorks Network for details.

Parameter List

Parameter No.	Name and Description	Details	
1	**[DPI Port]** Displays the port to which the module is connected. This will usually be port 5.	Default: Minimum: Maximum: Type:	5 0 7 Read Only
2	**[DPI Data Rate]** Displays the data rate used by the drive. This data rate is set in the drive, and the module detects it.	Default: Values: Type:	0 = 125 kbps 0 = 125 kbps 1 = 500 kbps Read Only
3	**[Ref/Fdbk Size]** Displays the size of the Reference/Feedback. The drive determines the size of the Reference/ Feedback.	Default: Values: Type:	0 = 16-bit 0 = 16-bit 1 = 32-bit Read Only

Parameter No.	Name and Description	Details	
4	**[Datalink Size]** Displays the size of each Datalink word. The drive determines the size of Datalinks.	Default: Values: Type:	0 = 16-bit 0 = 16-bit 1 = 32-bit Read Only
5	**[Reset Module]** No action if set to "Ready." Resets the module if set to "Reset Module." Restores the module to its factory default settings if set to "Set Defaults." This parameter is a command. It will be reset to "0 = Ready" after the command has been performed.	Default: Values Type: Reset Required:	0 = Ready 0 = Ready 1 = Reset Module 2 = Set Defaults Read/Write No
	ATTENTION: Risk of injury or equipment damage exists. If the module is transmitting I/O that controls the drive, the drive may fault when you reset the module. Determine how your drive will respond before resetting a connected module.		
6	**[Comm Flt Action]** Sets the action that the module and drive will take if the module detects that network communications have been disrupted (if **Parameter 7 - [RcvHrtBeat Time]** times out before nviDrvSpeedStpt is updated from the network).	Default: Values: Type: Reset Required:	0 = Fault 0 = Fault 1 = Stop 2 = Zero Data 3 = Hold Last 4 = Send Flt Cfg Read/Write No
	ATTENTION: Risk of injury or equipment damage exists. **Parameter 6 - [Comm Flt Action]** and **Parameter 7 - [RcvHrtBeat Time]** let you determine the action of the module and connected drive if communications are disrupted. By default, these parameters fault the drive. You can set these parameters so that the drive continues to run. Take precautions to ensure that the setting of these parameters does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).		
7	**[RcvHrtBeat Time]** Sets the time used as a Receive Heartbeat timer and triggers the fault action in **Parameter 6 - [Comm Flt Action]**.	Default: Minimum: Maximum: Type: Reset Required:	120.0 0.0 seconds 3276.7 seconds Read/Write No
	ATTENTION: Risk of injury or equipment damage exists. **Parameter 6 - [Comm Flt Action]** and **Parameter 7 - [RcvHrtBeat Time]** let you determine the action of the module and connected drive if communications are disrupted. Take precautions to ensure that the setting of these parameters does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, a disconnected cable).		

Parameter No.	Name and Description	Details
8	**[Idle Flt Action]** Sets the action that the module and drive will take during offline/disable occurrences.	Default: 0 = Fault Values: 0 = Fault 1 = Stop 2 = Zero Data 3 = Hold Last 4 = Send Flt Cfg Type: Read/Write Reset Required: No

ATTENTION: Risk of injury or equipment damage exists. **Parameter 9 - [Idle Flt Action]** lets you determine the action of the module and connected drive when an offline/disable condition occurs. By default this parameter faults the drive. You can set this parameter so that the drive continues to run. Take precautions to ensure that the setting of this parameter does not create a risk of injury or equipment damage. When commissioning the drive, verify that your system responds correctly to various situations (for example, an offline condition).

9	**[DPI I/O Config]** Sets the I/O that is transferred through the module to the drive. The Cmd/Ref bit must be set in order to control the drive via the network. The respective Datalink bit(s) must be set if the nvi/nvo Datalink variables are used.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read/Write Reset Required: N/A

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Ref
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

10	**[DPI I/O Active]** Displays the I/O that the module is actively transmitting to the drive. The value of this parameter will usually be equal to the value of **Parameter 9 - [DPI I/O Config]**.	Default: xxx0 0001 Bit Values: 0 = I/O disabled 1 = I/O enabled Type: Read Only

Bit Definition	Not Used	Not Used	Not Used	Datalink D	Datalink C	Datalink B	Datalink A	Cmd/Ref
Default	x	x	x	0	0	0	0	1
Bit	7	6	5	4	3	2	1	0

Parameter No.	Name and Description	Details
11	**[Flt Cfg Logic]** Sets the Logic Command data that is sent to the drive if any of the following is true: • **Parameter 6 - [Comm Flt Action]** is set to "4" (Send Flt Cfg) and communications are disrupted. • **Parameter 8 - [Idle Flt Action]** is set to "4" (Send Flt Cfg) and an offline/disable condition occurred. Refer to Logic Command Word on page C-1 for the bit definitions.	Default: 0000 0000 0000 0000 Minimum: 0000 0000 0000 0000 Maximum: 1111 1111 1111 1111 Type: Read/Write Reset Required: No
12	**[Flt Cfg Ref]** Sets the Reference data that is sent to the drive if any of the following is true: • **Parameter 6 - [Comm Flt Action]** is set to "4" (Send Flt Cfg) and communications are disrupted. • **Parameter 8 - [Idle Flt Action]** is set to "4" (Send Flt Cfg) and an offline/disable condition occurred. This is a linear engineering unit value where "0" equals 0 Hz. and "32,767" equals the Hz. value in VTAC 9 drive Parameter 55 - [Maximum Freq].	Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses a 16-bit Reference, the most significant word of this value must be set to zero (0) or a fault will occur.
13 14 15 16 17 18 19 20	**[Flt Cfg A1 In]** **[Flt Cfg A2 In]** **[Flt Cfg B1 In]** **[Flt Cfg B2 In]** **[Flt Cfg C1 In]** **[Flt Cfg C2 In]** **[Flt Cfg D1 In]** **[Flt Cfg D2 In]** Sets the data that is sent to the Datalink in the drive if any of the following is true: • **Parameter 6 - [Comm Flt Action]** is set to "4" (Send Flt Cfg) and communications are disrupted. • **Parameter 8 - [Idle Flt Action]** is set to "4" (Send Flt Cfg) and an offline/disable condition occurred. Note that these are 32-bit values. If 16-bit Datalinks are active, only the least significant word will be used. If the 32-bit value is out of range for a 16-bit Datalink, a configuration error will force a correction before I/O can be enabled.	Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Default: 0 Minimum: 0 Maximum: 4294967295 Type: Read/Write Reset Required: No **Important:** If the drive uses 16-bit Datalinks, the most significant word of this value must be set to zero (0) or a fault will occur.

Parameter No.	Name and Description	Details	
21	**[Send Service Pin]** Broadcasts a LON Service Pin Message from the Neuron Chip. This provides the Neuron ID. An alternate method for providing the Neuron ID is enter the ID number manually. The Neuron ID can be viewed in Diagnostic Item #30 (see Viewing Module Diagnostic Items on page 5-4).	Default: Values: Type: Reset Required	0 = Ready 0 = Ready 1 = Send Read/Write No
22	**[Clear Counters]** Clears the network diagnostic counters (Diagnostic Items #26 and #27).	Default: Values Type: Reset Required:	0 = Ready 0 = Ready 1 = Clear Read/Write No
23	**[DrvSpeedParam]** Sets the VTAC 9 drive parameter number to be used with nvoDrvSpeed. See Drive Speed on page 4-10. Setting this parameter value to zero (0) disables the firmware from acquiring the corresponding parameter value from the drive.	Default: Values: Type: Reset Required:	1 VTAC 9 drive parameter values Read/Write Yes
24	**[DrvCurntParam]** Sets the VTAC 9 drive parameter number to be used with nvoDrvCurnt. See Drive Current on page 4-10. Setting this parameter value to zero (0) disables the firmware from acquiring the corresponding parameter value from the drive.	Default: Values: Type: Reset Required:	3 VTAC 9 drive parameter values Read/Write Yes
25	**[DrvPwrParam]** Sets the VTAC 9 drive parameter number to be used with nvoDrvPwr. See Drive Power on page 4-10. Setting this parameter value to zero (0) disables the firmware from acquiring the corresponding parameter value from the drive.	Default: Values: Type: Reset Required:	7 VTAC 9 drive parameter values Read/Write Yes
26	**[DrvVoltParam]** Sets the VTAC 9 drive parameter number to be used with nvoDrvVolt. See Drive Voltage on page 4-11. Setting this parameter value to zero (0) disables the firmware from acquiring the corresponding parameter value from the drive.	Default: Values: Type: Reset Required:	6 VTAC 9 drive parameter values Read/Write Yes
27	**[DrvRunHoursParam]** Sets the VTAC 9 drive parameter number to be used with nvoDrvRunHours. See Operation Hour Counter on page 4-11. Setting this parameter value to zero (0) disables the firmware from acquiring the corresponding parameter value from the drive.	Default: Values: Type: Reset Required:	10 VTAC 9 drive parameter values Read/Write Yes

Parameter No.	Name and Description	Details	
28	**[DrvFrqActParam]** Sets the VTAC 9 drive parameter number to be used with nvoDrvFreqAct. See Output Frequency on page 4-11. Setting this parameter value to zero (0) disables the firmware from acquiring the corresponding parameter value from the drive.	Default: Values: Type: Reset Required:	1 VTAC 9 drive parameter values Read/Write Yes
29	**[NmlFreqParam]** Sets the VTAC 9 drive parameter number to be used with nciNmlFreq. See Nominal Frequency on page 4-14.	Default: Values: Type: Reset Required:	43 VTAC 9 drive parameter values Read/Write Yes
30	**[NmlSpeedParam]** Sets the VTAC 9 drive parameter number to be used with nciNmlSpeed. See Motor Nominal Speed on page 4-14.	Default: Values: Type: Reset Required:	44 VTAC 9 drive parameter values Read/Write Yes
31	**[MaxSpeedParam]** Sets the VTAC 9 drive parameter number to be used with nciMaxSpeed. See Maximum Speed on page 4-15.	Default: Values: Type: Reset Required:	55 VTAC 9 drive parameter values Read/Write Yes
32	**[MinSpeedParam]** Sets the VTAC 9 drive parameter number to be used with nciMinSpeed. See Minimum Speed on page 4-15.	Default: Values: Type: Reset Required:	81 VTAC 9 drive parameter values Read/Write Yes
33	**[RampUpTmParam]** Sets the VTAC 9 drive parameter number to be used with nciRampUpTm. See Ramp Up Time on page 4-16.	Default: Values: Type: Reset Required:	140 VTAC 9 drive parameter values Read/Write Yes
34	**[RampDownTmParam]** Sets the VTAC 9 drive parameter number to be used with nciRampDownTm. See Ramp Down Time on page 4-16.	Default: Values: Type: Reset Required:	142 VTAC 9 drive parameter values Read/Write Yes

Logic Command/Status Words

Appendix C provides the definitions of the Logic Command/Logic Status words that are used for the VTAC 9 AC Drive.

Logic Command Word

Logic Bits																	
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Command	Description
															x	Stop [1]	0 = Not Stop 1 = Stop
														x		Start [1][2]	0 = Not Start 1 = Start
													x			Jog	0 = Not Jog 1 = Jog
												x				Clear Faults	0 = Not Clear Faults 1 = Clear Faults
										x	x					Direction	00 = No Command 01 = Forward Command 10 = Reverse Command 11 = Hold Present Direction
									x							Local Control	0 = No Local Control 1 = Local Control
								x								MOP Increment	0 = Not Increment 1 = Increment
						x	x									Accel Rate	00 = No Command 01 = Use Accel Time 1 10 = Use Accel Time 2 11 = Use Present Time
				x	x											Decel Rate	00 = No Command 01 = Use Decel Time 1 10 = Use Decel Time 2 11 = Use Present Time
	x	x	x													Reference Select [3]	000 = No Command 001 = Ref. 1 (Ref A Select) 010 = Ref. 2 (Ref B Select) 011 = Ref. 3 (Preset 3) 100 = Ref. 4 (Preset 4) 101 = Ref. 5 (Preset 5) 110 = Ref. 6 (Preset 6) 111 = Ref. 7 (Preset 7)
x																MOP Decrement	0 = Not Decrement 1 = Decrement

(1) A “0 = Not Stop” condition (logic 0) must first be present before a “1 = Start” condition will start the drive. The Start command acts as a momentary Start command. A “1” will start the drive, but returning to “0” will not stop the drive.

(2) This Start will not function if a digital input (parameters 361-366) is programmed for 2-Wire Control (option 7, 8 or 9).

(3) This Reference Select will not function if a digital input (parameters 361-366) is programmed for “Speed Sel 1, 2 or 3” (option 15, 16 or 17). Note that Reference Select is “Exclusive Ownership.”

Logic Status Word

Logic Bits																
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Status	Description
															x	Ready	0 = Not Ready 1 = Ready
														x		Active	0 = Not Active 1 = Active
													x			Command Direction	0 = Reverse 1 = Forward
												x				Actual Direction	0 = Reverse 1 = Forward
											x					Accel	0 = Not Accelerating 1 = Accelerating
										x						Decel	0 = Not Decelerating 1 = Decelerating
									x							Alarm	0 = No Alarm 1 = Alarm
								x								Fault	0 = No Fault 1 = Fault
							x									At Speed	0 = Not At Reference 1 = At Reference
				x	x	x										Local Control [1]	000 = Port 0 (TB) 001 = Port 1 010 = Port 2 011 = Port 3 100 = Port 4 101 = Port 5 110 = Port 6 111 = No Local
x	x	x	x													Reference	0000 = Ref A Auto 0001 = Ref B Auto 0010 = Preset 2 Auto 0011 = Preset 3 Auto 0100 = Preset 4 Auto 0101 = Preset 5 Auto 0110 = Preset 6 Auto 0111 = Preset 7 Auto 1000 = Term Blk Manual 1001 = DPI 1 Manual 1010 = DPI 2 Manual 1011 = DPI 3 Manual 1100 = DPI 4 Manual 1101 = DPI 5 Manual 1110 = Reserved 1111 = Jog Ref

[1] See “Owners” in the drive User Manual for further information.

B

Binding

A process whereby a Network Variable Input and a Network Variable Output are connected together. Binding a network variable tells the device which other devices it should talk to and what information it should share. Only network variables of the same SNVT type can be bound together. For example, a temperature type could not be bound to a pressure type.

Bus Off

A condition that occurs when an abnormal rate of errors is detected in a device. The bus off device cannot receive or transmit messages on the network. This condition is often caused by corruption of the network data signals due to noise or data rate mismatch.

C

Channel

The transmission media that connect devices on the network such as twisted pair 78 kbps or power line carrier. Also called segment.

Configuration Property

A data value used to configure the application program in a device.

D

Data Rate

The speed at which data is transferred on the network. Each device on a network must be set for the same data rate.

Datalink

A type of pointer used by VTAC 9 drives to transfer data to and from the controller. Datalinks allow specified parameter value(s) to be accessed or changed without using explicit messages. The drive determines the size of Datalinks.

DPI (Drive Peripheral Interface)

A second generation peripheral communication interface used by VTAC 9 drives.

DPI Peripheral

A device that provides an interface between DPI and a network or user. Peripheral devices are also referred to as “modules” and “adapters.” The RECOMM-LON module, RECOMM-232 converter, and LCD OIM are examples of DPI peripherals.

DPI Products

A device that uses the DPI communications interface to communicate with one or more peripheral devices. For example, a motor drive such as a VTAC 9 drive is a DPI product. In this manual, a DPI product may also also be referred to as “drive” or “host.”

F

Fault Action

Determines how the module and connected drive act when a communications fault (for example, a cable is disconnected) occurs or when the controller is offline or disabled. The former uses a communications fault action, and the latter uses an idle fault action.

Fault Configuration

When communication is disrupted (for example, a cable is disconnected), the module and connected drive can respond with a user-defined fault configuration. The user sets the data that is sent to the drive using specific fault configuration parameters in the module. When a fault action parameter is set to use the fault configuration data and a fault occurs, the data from these parameters is sent as the Logic Command, Reference, and/or Datalink(s).

Flash Update

The process of updating firmware in a device. The module can be flash updated using VS Utilities software (version 3.01 or higher).

H

Hold Last

When communications are disrupted (for example, a cable is disconnected), the module and connected drive can respond by holding last. Hold last results in the drive receiving the last data received via the network connection before the disruption. If the drive was running and using the Reference from the module, it will continue to run at the same Reference.

I

Interoperability

The ability of systems from different manufacturers and of different types to share information with each other without losing any of their independent functional capabilities and without requiring complex programming by the integrator.

I/O Data

I/O data, sometimes called “implicit messages” or “input/output,” transmit time-critical data such as a Logic Command and Reference. The terms “input” and “output” are defined from the controller’s point of

view. Output is produced by the controller and consumed by the module. Input is produced by the module and consumed by the controller.

L

Logic Command/Status

The Logic Command is used to control the VTAC 9 drive (for example, start, stop, direction). It consists of one 16-bit word of output to the module from the network. The definitions of the bits in this word depend on the drive.

The Logic Status is used to monitor the VTAC 9 drive (for example, operating state, motor direction). It consists of one 16-bit word of input from the module to the network. The definitions of the bits in this word depend on the drive.

LON

An acronym for local operating network, which consists of intelligent devices, or nodes, that are connected by one or more communications media and that communicate with one another using a common protocol.

LonMaker Software

Windows™-based software package for designing, documenting, installing, and maintaining multi-vendor, open, interoperable LonWorks networks.

LonWorks Device

Hardware and software than runs an application and communicates with other devices using the LonWorks protocol. The LonWorks device may optionally interface with input/output hardware. It includes at least one processor and a LonWorks transceiver, and typically has a Neuron Chip.

LonWorks Network

Intelligent devices that communicate with each other using the LonWorks protocol over one or more communications channels.

LonWorks Protocol

The open control networking protocol designed for applications involving sense, monitor, control, and identification functions. It is also known as EIA 709.1 Control Networking Standard and as LonTalk® protocol.

M

Module

Devices such as drives, controllers, and computers usually require a module to provide a communication interface between them and a

network such as LonWorks. A module reads data on the network and transmits it to the connected device. It also reads data in the drive and transmits it to the network.

The RECOMM-LON module connects a VTAC 9 drive to a LonWorks network. Modules are sometimes also called “cards,” “embedded communication options,” “gateways,” “adapters,” and “peripherals.”

N

Network Variable

A data item that a particular device application program expects to get from other devices on a network (a Network Variable Input) or expects to make available to other devices on a network (a Network Variable Output). Examples are a temperature, switch value, and actuator position setting.

Neuron Chip

A microprocessor usually contained in each LonWorks node which processes all LonTalk protocol messages, senses inputs, manipulates outputs, implements application-specific functions, and stores installation-specific parameters.

Node

An intelligent device connected to the network. Nodes are programmed to send messages to one another in response to changes in various conditions, and to take action in response to messages they receive.

NVS (Non-Volatile Storage)

NVS is the permanent memory of a device. Devices such as the module and drive store parameters and other information in NVS so that they are not lost when the device loses power. NVS is sometimes called “EEPROM.”

O

OIM (Operator Interface Module)

A device that can be used to configure and control a drive. VTAC 9 OIMs can be used to configure VTAC 9 drives and connected peripherals.

P

Protocols

Rules that order how information is transmitted and presented. An “open protocol” is one in which the manufacturer has made the language “translation” available to anyone who wishes to use it.

R

Reference/Feedback

The Reference is used to send a setpoint (for example, speed, frequency, torque) to the drive. It consists of one word of output to the module from the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

Feedback is used to monitor the speed of the drive. It consists of one word of input from the module to the network. The size of the word (either a 16-bit word or 32-bit word) is determined by the drive.

S

SCPT (Standard Configuration Property Type)

SCPTs are standardized definitions of the units, scaling, encoding, and meaning of the contents of configuration properties.

SNVT (Standard Network Variable Type)

SNVTs are a set of predefined types of network variables with associated units, such as degrees, centigrade, etc. SNVTs promote interoperability of products from different manufacturers by standardizing the names given to Network Variable Inputs and Network Variable Outputs.

Status Indicators

LEDs that are used to report the status of the module, network, and drive. They are on the module and can be viewed on the front cover of the drive when the drive is powered.

T

Transceiver

A device that is both a transmitter and a receiver for a communications channel.

Type 0/Type 1/Type 2 Control

When transmitting I/O, the module can use different types of messages for control. The Type 0, Type 1, and Type 2 events help Rockwell Automation personnel identify the type of messages that is used.

V

VS Utilities Software

VS Utilities software is a tool for monitoring and configuring VTAC drives and communication modules. It can be run on computers running various Microsoft Windows operating systems. VS Utilities (version 3.01 or higher) can be used to configure this module and VTAC 9 drives. Information about VS Utilities software can be accessed at www.vtacdrives.com.

Z

Zero Data

When communications are disrupted (for example, a cable is disconnected), the module and connected drive can respond with zero data. Zero data results in the drive receiving zero as values for Logic Command, Reference, and Datalink data. If the drive was running and using the Reference from the module, it will stay running but at zero (0) Reference.

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